

SyncWare News

The journal for technical
applications of T/S
computers

Volume 3 Number 1 Sept.-Oct. '85



Happy Birthday to Us

Welcome to our anniversary issue. This marks the beginning of our third year of support for TS computers. We would like to thank all of you for supporting us. The computer industry as a whole is really in the doldrums now, and I would like to add that continuing support for your computer is in your hands. We all must make it a point to let our favorite software and hardware distributors know what things we like and dislike and what we need. Continued communication and feedback will extend support and expand the scope of options that will become available for you. We hope that advertisers in SWN have what you want, and we are sure that you'll find doing business with them pleasurable. If you would like to see us grow, then we would appreciate your mentioning of SWN to all of your TS related friends and business associates. Thank you.

256K Ram!

Aerco, who as had their disc interface available for several months now, offers a 256K RAM upgrade either configured as a ramdisc or port mapped in 64K banks shadowing the cartridge bank. It is available now for \$50.00+p&h. Call or write for details. This is just the beginning. It looks like there is no end in sight for the amount or number of ways that you can add memory to the TS 2068!

Who Won?

It was tough indeed! In the 1000 corner, Gregory Harder, Denver, CO, came in first with Software LO-Res and John Byrne of Cookeville, TN, took second place with GET input program. And in the 2068 corner, again there was fierce competition. First prize went to John Nguyen of Louisville, KY, for submitting PIX FIX, and second prize went to Wes Brzozowski of Endicott, NY for his fully implemented 64 Column Basic. There were many excellent submissions to this contest. Consequently, there are really quite a few runners up. We are presently pondering the best way to handle all of this I/O. We do promise that we'll get as many of your programs into print as we possibly can, one way or another. GET READY!! We are planning another contest that will be bigger and better. Stay Tuned!

MEMONOTES Makes Debut

A new quarterly newsletter, for owners of Memotext and/or Memocalc and truly serious 1000 owners, is available. It will cover Beginners Tips and Hackers Hints, and it will show you how to use these programs to their full potential, and then some. The cost is \$13.95 and is available from Syncware, PO Box 64, Jefferson, NH 03583.

BYTE-BACK

IN THE BEGINING THERE WAS SINCLAIR
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BYTE-BACK HAS BEEN MANUFACTURING PERIPHERALS FOR TIMEX / SINCLAIR COMPUTER OWNERS SINCE 1981. IT HAS ADDED MANY NEW PRODUCTS SINCE ITS FIRST M16 AND BB-1 CONTROLLER. BYTE-BACK HAS PULLED THROUGH THE DEMISE OF TIMEX AND WILL CONTINUE TO PROVIDE SUPPORT AND NEW PRODUCTS IN THE FUTURE.

MODEM MD-28 for ZX81,TS1000,TS1500
MD-68 for TS2068

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PARALLEL 2068 for TS2068

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SWN

FOR YOUR SUPPORT

This column announces any software or hardware that is new or otherwise untested by us. If you have something of interest, send us a description of your product. We advise readers to send a SASE, as a courtesy, to the individuals or companies, for further information.

Chia-Chi Chao, 73 Sullivan Dr., Moraga, CA 94556, has Word Twister available for both machines. It generates word puzzles based on information that you type in. \$10.00 for the 1000, \$13.00 for the 2068+1.00p&h.

Mike Trivisonno, 1322 Golden Gate Blvd., Mayfield Hts., OH 44124, 216 449 1666, has CIDS. It has a full screen editor, over 30 commands, 16K data storage and has the ability to learn new commands. It comes with after sale support, and manual. SASE for info or \$14.95 for program on cassette.

Jack Dohaney, 325 O'Connor St., Menlo Park, CA 94025, has a MC Relocator, that will move your machine code routines. You should be unafraid to learn MC. Send SASE first. Net Profit enables you to keep track of 70 accounts and print out a Schedule C. Each program is \$8.95

Fred Nachbaur, Compartment 12, Mtn. Stn. Group Box, Nelson, BC V1L 5P1, Canada, has Fourier Analysis for both computers. It comes on tape with a tutorial booklet and manual for \$18.95.

Tim Worcester, The Electronic Closet, 8187 Blakely Court West, Bainbridge Is., WA 98110, has a Gorilla Banana Conversion Kit. It provides upper & lower case with true descenders and graphics, but no alternate foreign language characters. To order you must specify your printer eprom ID as 3LE, 3AL-1 or 4AE-0. The price is \$14.95.

Games To Learn By, 28 Claire Hill Rd., Collinsville, CN 06022, 203 673 7089, has a portability package that allows you to "Take your 2068 with you." They have a multitude of configurations depending on what you have and what you need. Send SASE for more info.

Kraig Pritts-KA2LHO, 3421 Oneida St., Chadwicks, NY 13319, MCI Mail: 262 5517, Compuserve: 74676, 3320, has the Ham Helper Series catalog. It includes a compendium of programs designed to put the Sinclair computers to work in a Ham shack. Send SASE for info. Programs can be supplied on A&J Microdrive.

John Oliger, 11601 Whidbey Dr., Cumberland, IN 46229, has a Kempston compatible joystick that plugs into his expansion board. The port is fully decoded and can be used on the 1000, but it requires some MC effort. The bare board is \$10.95 and with a parts kit is \$16.95 or \$21.95 assembled and tested (add \$3.00 if you want gold plated edge traces).

Tom Woods, PO Box 64, Jefferson, NH 03583, has a 32K Non-Volatile Ram board that plugs into the cartridge Slot. It is mapped from 32K to 64K and can be in either the cartridge bank or the Exrom bank (requires Exrom decoding as per SWN 2/3 pg. 19). The board comes with a write protect switch and driver software. It is available for \$109.95.

Knighted Computers, 707 Highland St., Fulton, NY 13069, has just reduced prices in their catalog. They have 2068 Pascal and 2068 "C" for \$18.50 each. White Lightning is available for \$21.95. Send for more info.

The SyncWare News

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Thomas J. Bent Editor
Fred A. Nachbaur Technical Director

All subscription information, billing and ad artwork should be addressed to:

SyncWare News
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(603) 586 7734

Article submissions, Forum, Support listings, Classified ads and easy questions, should be addressed to:

SyncWare News
9016 Flicker Place
Columbia, MD 21045
(301) 730 7187

Article submissions, issue tapes (when warranted), hardware and related tough questions should be addressed to:

Syncware News
Mountain Station Group Box 12
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(604) 354 3858

Back issues of SWN are available for \$3.50 each. Volume #1 (for the 1000) is available for \$16.95.

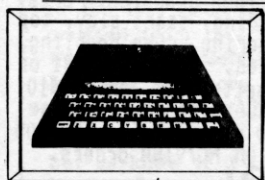
SWN is done entirely on TS computers. Submissions are preferred as word processed text files (so we need not re-invent your article) on good tape. Memotext for the 1000 and 1500 and Mscript for the 2068 are preferred word processors. Documents submitted in Tasword Two and other word processors must be done in 52 column format. If you do not have a word processor, but you still have a good idea, then don't hesitate to work it up and submit it. SWN pays authors about \$40.00 per page for original articles. This amount will vary slightly from issue to issue and is paid when the article is published. Write for more information.



GET BACK TO BASICS with BASICALLY PROGRAMMING

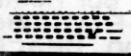
Basically
programming

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FORUM

Well, as the little gremlins would have it, that TS1500 bug fix (SWN 2/6 Forum) had a bug of its own! In the corrected code for EPROM, at location 5361, I have 1863h, which is JR BADT. What it was supposed to be was JR NC BADT or 3063h. Also, since this is a two byte instruction instead of a three byte instruction, the next location (5363h) should contain a NOP (this byte ended up on the cutting room floor).

Dear Editor, would it be possible for you to print a schematic depicting how to install that "reverse diode" (SWN 2/6 Forum), as mentioned in John Oliger's letter?

Jean-Claude Touzin, CP 41, La Sarre, P.Q. J9Z 2X4

Yes! You need a 1N4148 diode. We printed the LOAD schematic in SWN 2/5 pg. 7. The diodes are CR25 and CR26. Your addition would be to have the third diode parallel these two, but it would go in the reverse direction. In SWN 2/3 pg. 13, CR25 & 26 are located just left of C56. It may be necessary to mount the diode under the board, because there may be some silicone glue partially covering the diodes.

Dear Editor, Your Spectrum, (8/85) pg. 17, gave a POKE into the Spectrum channels area, which puts the edit line at the top of the screen. For the 2068, POKE 26692, 83. To restore normal operation, POKE 26692, 75.

The first POKE puts the letter "S" (i.e., Screen) in the channel-code byte in the first channel record. This is the part of the channels area that handles streams #0 and #1 (the keyboard IN and the edit line and error messages OUT). The second POKE restores the code for "K."

P. H. Skipper

Dear Editor, we are trying to figure out how to program the 2050 Modem from Basic. Micro-Systems seems to be stonewalling us on how or where to find this information. Could you put us in touch with someone who might know to set the word length, stop bits, etc? I would also like to announce that the S. Florida ZX User Group has a BBS on line (305-439-5077).

Chris Sloan, 4221 Turnberry Cir. #11, Lake Worth, FL 33463

May I suggest another avenue? Why not use a REAL RS232 interface. Aerco has a dual RS232 that is documented and programmable from Basic. It also will run much faster than 300 baud. They supply a terminal emulator with the interface that preconfigures all operating parameters. You may then use any Modem available on the market. You can also drive a printer simultaneously. Aerco is one of the few TS related manufacturers that still offers technical support.

Barry Carter may be able to help you. He has written a book explaining how to use the 2050 and Mterm software. His address is PO Box 614, Warren, MI 48090, 313 537 8559. We'll look around for more info.

Dear Editor, the challenge to check your figures in SWN 2/5 !Off the Wall column, caught my attention. I came up with a printout of 1.0776E12 miles; certainly a respectable distance. According to my latest information, Pluto's year is 248.4 of ours. At an orbital velocity of 2.9 miles/sec., the circumference of Pluto's orbit is 2.2732E10 miles. This means that the printout would only make it 47.4 times! Would our printout make it to Betelgeuse before Radio Shack runs out of paper?

Paul Bingham, Pleasantrees Programming, PO Box 2034, Mesa, AZ 85204.

COMPUSA owners! A national Compusa user group is being formed to promote the use and understanding of this system. Contact Tony Gomez, 2013 #3 Los Feliz, Thousand Oaks, CA 91362 for more information.

Dear Editor, I am enclosing my check for renewal with apprehension. It is not a reluctance to waste money, but a suspicion that I will regret having done so by next year.

Some of us really enjoy our 1000's and don't want to get a bigger computer... I think what I'm trying to say is that you publishers continue to significantly decrease the number of words that are applicable to the 1000 as you get more sophisticated with the 2068 and QL... Be forewarned that you will have to give up a whole bunch of us that will be left behind as you progress. I'm going to hang on for another year, but I honestly expect that I will be lost by the time my subscription expires. It is worth thinking about.

Paul Edwards, 1613 Sheila Dr. Pelican Bay, TX 76020

As I sent you a synopsis of our Vol. 2 contents, I won't repeat it. We also have Vol. 1. It is all 1000 stuff. Is it that you know all about your machine? You mentioned some "mods" that you have made. Would you like to tell us about them? We can only publish what is written. We are here to serve you. Don't complain to us: Give us direction. Tell us what it is you would like to see or read about. Many of you know that we often give personal answers, but sometimes we just get swamped too. Some questions do get developed into articles and some are answered in the Forum. I know of someone (peter McMullin) who converted T. Woods "2068 Word Images" for the 1000!

Although I don't feel that the 1000 is getting a bum steer here, fair is fair. We will not give up on the TS1000.

BACKGAMMON

Looking for a real challenge? Tired of slow response time? Practicing for a tournament? If so, you'll want to try our Backgammon game. Features: full-screen graphics, break disabled, 100% machine code, clean loading, smart play, top rating from TSUG review, multi-game scoring, cube doubling, simple operation, documentation included. Requires ZX81 or TS1000 w/16K RAM. Available on cassette for only \$10. In a 10 game test against PSION, BIOCAL won every game! Write for our FREE catalog listing 100 programs for TS 1000 and 2068. Please include expir. date on MC/VISA orders.



BIOCAL
SOFTWARE, INC.

P.O. Box 965
Stinson Beach, CA 94970

UPD Modifications

Thanks to Peter McMullin, we now have a "Print an ASCII character" routine for the Centronics interface from EPROM Services in England. This can be patched into the "Universal Printer Driver" by entering the following code:

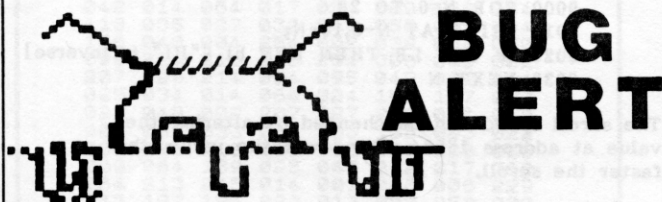
```

29D8~E5      ASCII PUSH HL
29D9 C5      PUSH BC
29DA F5      PUSH AF
29DB CDE702  CALL TFAS
29DE DB9B    STAT IN A, (9B)
29E0 17      RLA
29E1 38FB    JR C STAT
29E3 F1      SEND POP AF
29E4 D3BB    OUT (8B).A
29E6 AF      XOR A
29E7 D3BB    OUT (8B).A
29E9 AF      XOR A
29EA D3BB    OUT (8B).A
29EC DB9B    IN A, (9B)
29EE 17      BUSY RLA
29EF 3005    JR NC 29F6
29F1 17      ACK? RLA
29F2 3002    JR NC 29F6
29F4 18F6    JR 29EC
29F6 CD0702  CALL MDCK
29F9 C1      POP BC
29FA E1      POP HL
29FB C9      RET
29FC 00      NOP
29FD 00      NOP
29FE 00      NOP
29FF 00      NOP
    
```

Also, you have to add this little nine-byte initialization routine somewhere in memory (e.g. a 1 REM statement). Call this once, before printing, to initialize the PIO chip.

```

40B2~3E8B    INIT LD A,8B
40B4 D3BB    OUT (8B).A
40B6 3E01    LD A,01
40B8 D3BB    OUT (8B).A
40BA C9      RET
    
```



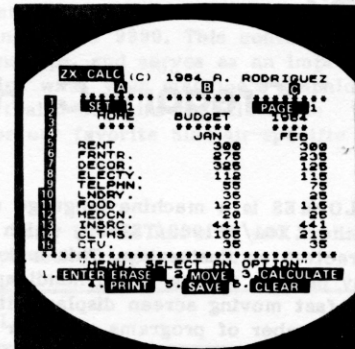
There is yet another omitted label on the schematic for the video-reverse driver in SWN Vol. 1. The top of the summing resistor chain (the 390 ohm resistor) at the output of the comparators goes to +5V.

In the last issue (2:6) the author's name was omitted from the "Adding on to Gladstone" article. We hope that Jeff Moore is not too upset with us. Jeff was also very helpful in developing UPD, and should have been included in the acknowledgments.

Let us know if YOU find any errors or omissions. Though "we try harder," we're far from perfect.

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ZX-CALC



An electronic spreadsheet calculator is the fundamental basic tool for summarising, reporting and analyzing in matrix form any accounting, mathematical or scientific manipulation of numbers. ZX-Calc operates in 32-64K RAM and affords a maximum of 3360 characters / spreadsheet. The entire matrix consists of 15 columns (letters A-O) and 30 rows (numbers 1-30) with 8 characters / cell. Unlike other popular ESCs, ZX-Calc uses in calculations and within cells all 14 math functions on the ZX-81 / TS1000. It offers a unique "SUM" function that totals one or more rows / columns simultaneously. Parenthesis can be used within equations. There is no fixed limit on how many equations may be entered. Formulas may be stored in all 420 cells of the spreadsheet. The display affords 15 rows / columns. Loading of data into more than one cell can occur across / down one or more row / column simultaneously. With vertical windowing you can arrange a set of columns in any order, or practice using fixed-variable-alignment display formats. The menu offers 6 options: enter / erase, move, calculate, print, save and clear the spreadsheet. Enter / erase allows the entering, deletion or data alignment within a cell through the use of a mobile cursor. With the move option you may move around the entire spreadsheet to access any row, column or cell. The calculate option allows you to enter labels, values or formulas into a cell or write and enter equations that will act upon the data already within the spreadsheet. You can also enter bar graphs into a cell in this option. Absolute / relative replication, down / across a column / row, is also allowed by this option. Also this option allows the automatic calculation of the entire spreadsheet with one single command. Print allows you to output to either the ZX / TS printer the entire spreadsheet by column-sets and row-pages through use of the COPY command. The entire spreadsheet may be saved on cassette tape or you may clear all data from it or erase the program from RAM entirely. The most salient advantage provided by an ESC over specifically vertical applications software is that an ESC provides a reusable framework with which you can compose any specific financial model rather than just be limited to only one statically fixed format for storing, displaying and manipulating numerical data.

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TS1000

1st Prize!
SyncWare News Competition

SOFTWARE LO-RES For TS1000

Gregory C. Harder

SOFTWARE LO-RES is a machine-language utility program for the ZX81/TS1000/TS1500, which creates enlarged characters on the screen. This makes it useful for any persons with a visual handicap. Since it also allows fast moving screen displays; it is useful for any number of programs where a flashy screen is desired. You may want to consider using it for title displays, scrolling graphic actions games, "billboard" programs and so on.

Using SW Lo-Res

SW LO-RES is entered with a USR call to 16601. The form will always be:

```
xxxx LET LR=16601 (optional)
yyyy IF USR LR THEN REM [data string]
```

SW LO-RES will then process the data string immediately following the REM command. This data string will contain two pieces of information:

- 1: The characters which are to be printed, and
- 2: Various "control" characters which will instruct SW LO-RES on how to handle the character string.

The control characters consist of:

- <= (shift R) - Scroll up
- => (shift Y) - Scroll down
- ** (shift H) - Execute a "newline"
- <> (shift T) - Change print mode

The <> control character must be followed with the number corresponding to the desired print mode:

- <>0 = go into print mode 0
- <>1 = go into print mode 1
- <>2 = go into print mode 2
- <>3 = go into print mode 3
- <>5 = this is a special instruction which tells SW LO-RES to set the next print position to "Home", in other words, the upper left-hand corner of the screen. The print mode is not changed.

SW LO-RES will always start in print mode 0. Here is what the various print modes look like:

```
MODE 0 = P
MODE 1 = P
MODE 2 = P
MODE 3 = P
```

Sample Programs

This is the simplest program possible, with SW LO-RES. It prints an enlarged "P" to the screen in mode 0.

```
9000 LET LR=16601
9010 IF USR LR THEN REM P
```

The initial print position can be set by using a PRINT AT statement:

```
9000 LET LR=16601
9010 PRINT AT 0,5;
9020 IF USR LR THEN REM HELLO**hello
```

[second "hello" is inverse]

Note that subsequent print positions are controlled by SW LO-RES. Also in this sample, note the new-line character (**) which prints the inverse "hello" on the next line down.

Note how the new-line character works in this sample, since we changed to print mode 1.

```
9000 LET LR=16601
PRINT AT 2,10;
9020 IF USR LR THEN REM <>1HELLO**hello
```

Using the PRINT AT feature can produce some interesting displays. For example,

```
9000 FOR N=0 TO 28
9010 PRINT AT N-8,18-N;
9020 IF USR LR THEN REM hi ["HI" is inverse]
9030 NEXT N
```

The scroll speed can be changed by altering the value at address 16594. The lower the value, the faster the scroll.

Lo-Res Screen Copies

Since SW LO-RES uses the entire screen, a COPY routine is provided which will copy all 24 lines of the screen. It is called with a USR to address 16946. A second COPY routine, at address 16950, can be used to copy part of a screen, 1 to 22 lines. The number of lines is determined by the location of the print position; no POKES are needed. You must simply precede the call with a PRINT AT statement. For example, to copy half a screen:

```
xxxx PRINT AT 11,0;
yyyy RAND USR 16950
```

If the control characters are used correctly, very long data strings can be printed, allowing the creation of highly complex displays. Enter and RUN the "DEMO" program to explore some of the possibilities.

Error Conditions

When using SW LO-RES, the following error reports may occur:

REPORT	ERROR CONDITION
M	Improper mode request, in other words mode-control <> is not followed by 0, 1, 2, 3 or 5
L	Left margin overflow, results when trying to print off the left side of the screen.
R	Right-margin overflow
B	Bottom-margin overflow
S	String character error. Results if a token character is included in the data to be printed. (Does not include print-control tokens.)

Entering the Program

Start by entering the machine-code into a 1 REM statement, at least 445 bytes long. Use your favorite decimal loader to input the values in Table 1, from address 16514 through 16959. Alternately,

Table 1.

118	118	000	135	004	131	002	133
006	129	001	134	005	130	003	132
007	128	042	012	064	035	229	001
132	000	009	001	148	002	209	237
176	014	132	237	066	024	018	042
016	064	043	229	001	132	000	167
237	066	001	148	002	209	237	184
035	229	062	004	001	031	000	112
084	093	019	237	176	035	035	06
032	242	225	034	014	064	001	00
005	011	120	177	032	251	201	175
050	009	064	237	075	022	064	003
003	197	175	009	033	064	010	254
118	032	009	193	042	012	064	035
034	014	064	201	254	219	032	006
205	148	064	193	024	226	254	220
032	005	265	169	064	024	244	254
221	032	025	003	010	254	033	204
238	064	040	013	214	028	056	004
254	004	056	002	207	021	050	009
064	225	024	188	254	216	032	046
042	014	064	017	034	000	126	254
118	035	027	032	249	058	009	064
186	040	004	254	002	032	004	030
099	024	013	123	254	005	048	002
207	020	214	004	095	042	012	064
025	034	014	064	024	165	167	023
023	048	002	207	027	203	071	040
005	050	033	064	203	135	023	022
000	203	018	095	033	000	030	058
009	064	189	025	040	042	017	060
064	213	245	014	001	006	008	209
213	197	126	023	013	032	252	023
027	035	193	016	244	123	209	018
019	012	062	009	185	225	032	229
241	061	040	003	225	024	218	225
014	004	006	004	086	035	094	035
229	175	003	018	023	203	018	023
203	019	023	203	019	023	033	132
064	133	111	126	042	014	064	245
197	229	126	254	118	032	002	207
026	237	075	016	064	167	237	066
056	002	007	010	225	193	058	033
064	254	000	040	005	241	238	128
024	001	241	119	035	034	014	064
018	191	213	017	029	000	025	034
014	064	209	225	013	032	171	017
128	255	042	014	064	058	009	064
185	040	004	254	002	032	007	255
034	014	064	195	253	064	237	075
016	064	229	237	066	225	056	243
030	223	024	235	000	000	000	000
000	000	000	000	000	000	000	000
000	000	000	000	000	000	000	000
022	024	024	007	042	058	064	062
024	149	087	195	107	008		

Note: Enter each number working ACROSS.
For Example: 118 ENTER 118 ENTER 000 ENTER
135 ENTER 004 etc.

use an assembler or hex loader to input the mnemonics or hex values of the assembly listing of Listing 1. When complete and checked for errors, POKE 16510,0 to give the REM a line number of zero. SAVE the result to tape, for future incorporation into your own creations. Then enter the BASIC "DEMO" program of Listing 2, and SAVE it to tape separately, using GOTO 9990. This contains quite a few applications tips, and serves as an impressive demonstration of what your machine's graphic capabilities. (It also contains a little "free advertising" for our favorite Sinclair-specific magazine...)

Have fun with this. Let us know if you find any particularly interesting applications.

SW LO-RES Listing

[illegible]

```

2310 IF USR BT THEN REM <>1
**
**
**
2320 FOR N=0 TO 20
2330 PRINT AT N,0;
2340 IF USR BT THEN REM THE BEST
2350 NEXT N
2360 FOR N=0 TO 20
2370 PRINT AT N,0;
2380 IF USR BT THEN REM 3000BY
2390 NEXT N
2400 FOR N=0 TO 20
2410 PRINT AT N,0;
2420 IF USR BT THEN REM
2430 NEXT N
2440 LET A=INT (RND*9)
2450 GOTO 2150
9000 FOR N=0 TO 50
9010 NEXT N
9020 RETURN
9990 SAVE "SW-LO-RES-DEMO"
9995 RUN

```

7X-81 and TS-1000 Users !!

EPROMs contain routines for editing and development of Basic programs. Routines are Renumber, Copy, Search, Delete, Merge, REM Kill, Free Space, Unlock, Variables Print, Move, REM Generate, Hex/Decimal Converter, Program Size, NVM Storage, Tape Index. Requires Hunter NVM RomPak, CA1/O or other auxiliary memory board.

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Robert C. Fischer
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Summerville, Ga 30747

Disassembly Listing 1.

addr HEX NAME DEC ADDR CHR#

```

4082 76      118 16514      ;Data table
4083 76      118 16515      ; containing the
4084 00      0 16516        ; graphic symbols
4085 87      135 16517      ; used in
4086 04      4 16518        ; generating
4087 83      131 16519      ; the enlarged
4088 02      2 16520        ; characters
4089 85      133 16521      ;
408A 06      6 16522      ;
408B 81      129 16523      ;
408C 01      1 16524      ;
408D 86      134 16525      ;
408E 05      5 16526      ;
408F 82      130 16527      ;
4090 03      3 16528      ;
4091 84      132 16529      ;
4092 07      7 16530      ;
4093 80      128 16531      ;

```

addr HEXCODE NAME MNEMONIC

```

=====
4094 2A0C40  UPSC LD HL. (DFIL) ;The up-scroll routine
4097 23      INC HL              ;Start of the display file.
4098 E5      PUSH HL            ;Stack it.
4099 018400   LD BC.0084        ;Four rows down.
409C 09      ADD HL.BC          ;Set source.
409D 019402   LD BC.0294        ;Set counter.
40A0 D1      POP DE             ;Set destination
40A1 EDB0     LDIR              ;Move everything up four rows.
40A3 0E84     LD C.84           ;Four rows to clear.
40A5 ED42     SBC HL.BC         ;Set source.
40A7 1812     JR CLER          ;Clear the bottom four rows.
40A9 2A1040   DNSC LD HL. (VAR) ;The down-scroll routine.
40AC 2B      DEC HL            ;End of the display file.
40AD E5      PUSH HL            ;Stack it.
40AE 018400   LD BC.0084        ;Four rows.
40B1 A7      AND A              ;Clear carry.
40B2 ED42     SBC HL.BC         ;Set source.
40B4 019402   LD BC.0294        ;Set counter.
40B7 D1      POP DE             ;Set destination.
40BB EDB8     LDDR             ;Move everything down four rows.
40BA 23      INC HL            ;Set source.
40BB E5      CLER PUSH HL       ;Stack the source address.
40BC 3E04     LD A.04           ;Set counter for four rows.
40BE 011F00   CLNX LD BC.001F   ;Set counter, 31 spaces to clear.
40C1 70      LD (HL).B         ;Clear the first space.
40C2 54      LD D.H            ;Set destination.
40C3 5D      LD E.L            ;
40C4 13      INC DE            ;
40C5 EDB0     LDIR              ;Clear the row.
40C7 23      INC HL            ;Set for the next row.
40C8 23      INC HL            ;
40C9 3D      DEC A              ;Decrease the row counter.
40CA 20F2     JR NZ CLNX        ;If not zero then clear next row.
40CC E1      POP HL            ;Restore the source address.
40CD 220E40   LD (DFCP).HL      ;Set the next print position.
40D0 010105   LD BC.0501        ;Loop controlling scroll speed.
40D3 0B      DLAY DEC BC        ;Decrease the counter.
40D4 78      LD A.B            ;Is it zero?
40D5 B1      OR C              ;
40D6 20FB     JR NZ DLAY        ;No, continue countdown.
40D8 C9      RET               ;Yes, return to main program.
40D9 AF      STRT XOR A         ;Reset print mode (PMOD) vbl.
40DA 320940   LD (PMOD).A       ;
40DD ED4B1640 LD BC. (CHAD)     ;Locate the data string.
40E1 03      INC BC            ;Skip REM.
40E2 03      NEXT INC BC        ;Point to next char. in string.
40E3 C5      PUSH BC           ;Stack the string address.
40E4 AF      XOR A             ;Reset the graphics flag.
40E5 322140   LD (GFLG).A       ;
40E8 0A      LD A.(BC)         ;Get the current character.
40E9 FE76     CP 76            ;End of data string?
40EB 2009     JR NZ CTRL       ;No, check for control token.

```

```

40ED C1      END- POP BC        ;Yes, reset stack.
40EE 2A0C40   HOME LD HL. (DFIL) ;Reset print position.
40F1 23      INC HL            ;
40F2 220E40   LD (DFCP).HL      ;
40F5 C9      RET               ;
40F6 FEDB     CTRL CP DB        ;Is it a <= character?
40F8 2006     JR NZ DOWN        ;No, check for down scroll.
40FA CD9440   CALL UPSC        ;Yes, scroll up.
40FD C1      NXCH POP BC        ;Restore the character pointer.
40FE 18E2     JR NEXT          ;Do the next character.
4100 FEDC     DOWN CP DC        ;Is it a >= character?
4102 2005     JR NZ MODE        ;No, check for mode character.
4104 CDA940   CALL DNSC        ;Yes, scroll down.
4107 18F4     JR NXCH          ;Do the next character.
4109 FEDD     MODE CP DD        ;Is it a <> character?
410B 2019     JR NZ NULN        ;No, check for a newline character.
410D 03      INC BC            ;Point to the mode code.
410E 0A      LD A.(BC)         ;Get the mode code.
410F FE21     CP 21            ;Is it mode 5?
4111 CCEE40   CALL Z HOME      ;Yes, reset print position to home.
4114 280D     JR Z RSTR        ;Do the next character.
4116 D61C     SUB 1C           ;No, convert code char. into a number.
4118 3804     JR C ER-M        ;If carry then not a proper code.
411A FE04     CP 04           ;Check for proper code.
411C 3802     JR C SV-A        ;If no carry then not a proper code.
411E CF       ER-M RST 0BH      ;Error, improper mode code.
411F 15              ERROR M    ;Error code M.
4120 320940   SV-A LD (PMOD).A  ;Set PMOD value.
4123 E1      RSTR POP HL       ;Clear the old character pointer.
4124 18BC     JR NEXT          ;Do the next character.
4126 FEDB     NULN CP DB        ;Is it a ** character.
4128 202E     JR NZ SORT        ;No, all control have been tested.
412A 2A0E40   LD HL. (DFCP)    ;Yes, do a newline.
412D 112200   LD DE.0022       ;Determine NL for modes 1 & 3.
4130 7E       PAD- LD A.(HL)    ;
4131 FE76     CP 76            ;
4133 23      INC HL            ;
4134 1B      DEC DE            ;
4135 20F9     JR NZ PAD-        ;Test for mode 0.
4137 3A0940   LD A.(PMOD)      ;Mode 0?
413A BA       CP D             ;Yes, do horizontal newline.
413B 2804     JR Z LINE        ;Mode 2?
413D FE02     CP 02            ;No, do vertical newline.
413F 2004     JR NZ V-NL       ;Set for horizontal newline.
4141 1E63     LINE LD E.63      ;Do horizontal newline.
4143 180D     JR H-NL          ;Set for vertical newline.
4145 7B       V-NL LD A.E       ;Test for enough space in DFIL.
4146 FE05     CP 05            ;If no carry then space available.
4148 3002     JR NC V-OK       ;Error, left margin overflow.
414A CF       ER-L RST 0BH      ;Report code L.
414B 14              ERROR L    ;Set for vertical newline.
414C D604     V-OK SUB 04       ;
414E 5F       LD E.A           ;
414F 2A0C40   LD HL. (DFIL)     ;Set the NL print position.
4152 19       H-NL ADD HL.DE    ;
4153 220E40   LD (DFCP).HL      ;
4156 18A5     JR NXCH          ;Do next character.
4158 A7       SORT AND A        ;Clear carry.
4159 17              RLA        ;Test for token character.
415A 17              RLA        ;
415B 3002     JR NC GPHC        ;If no carry then not token.
415D CF       ER-S RST 0BH      ;Error, improper string character.
415E 1B              ERROR S    ;Error code S.
415F CB47     GPHC BIT 0.A       ;Test for a graphic character.
4161 2805     JR Z NRML        ;If not set then a normal character.
4163 322140   LD (GFLG).A       ;Set the graphics flag.
4166 CB87     RES 0.A           ;Reset the graphics bit.
4168 17       NRML RLA          ;Character code * 8
4169 1600     LD D.00          ;Reset register D.
416B CB12     RL D             ;Carry to D, set if code > 32
416D 5F       LD E.A           ;DE = chr. code * 8.
416E 21001E   LD HL.1E00        ;Point to bit pattern table.
4171 3A0940   LD A.(PMOD)      ;Test for mode 0.
4174 BD       CP L             ;Mode 0?

```

4175 19	ADD HL,DE	;Point to the character pattern.	41E5 77	PRNT LD (HL),A	;Print the symbol.
4176 282A	JR Z MD-0	;Yes, do mode 0.	41E6 23	INC HL	;Point to the next print position.
417B 113C40	LD DE,PRBF	;No, point to PRBUFF.	41E7 220E40	LD (DFCP),HL	;Set DF-CP.
417B D5	ROT- PUSH DE	;Stack PRBUFF pointer.	41EA 10BF	DJNZ 2BTS	;Repeat until B is zero.
417C F5	PUSH AF	;Stack MODE counter.	41EC D5	PUSH DE	;Stack the pattern bytes.
417D 0E01	LD C,01	;Initialize SHIFT counter.	41ED 111D00	LD DE,001D	;Set the next print position.
417F 0608	MORE LD B,08	;Initialize LINE counter.	41F0 19	ADD HL,DE	
4181 E5	PUSH HL	;Stack pattern pointer.	41F1 220E40	LD (DFCP),HL	
4182 D5	PUSH DE	;Stack PRBUFF pointer.	41F4 D1	POP DE	;Restore the pattern bytes.
4183 C5	TURN PUSH BC	;Stack SHIFT-LINE counter.	41F5 E1	POP HL	;Restore the pattern pointer.
4184 7E	LD A,(HL)	;Get the bit pattern byte.	41F6 0D	DEC C	;Decrease row counter.
4185 17	SHFT RLA	;Shift bit to carry.	41F7 20AB	JR NZ 2ROW	;If not 0 then next 2 rows of pattern.
4186 0D	DEC C	;SHIFT counter 0?	41F9 1180FF	LD DE,FF80	;Set print pos. for next enlarged char.
4187 20FC	JR NZ SHFT	;No, shift more.	41FC 2A0E40	LD HL,(DFCP)	
4189 CB1B	RR E	;Yes, carry to bit 7, E.	41FF 3A0940	LD A,(PMOD)	;Test PMOD value.
418B 23	INC HL	;Increase the pattern pointer.	4202 B9	CP C	;Mode 0?
418C C1	POP BC	;Restore SHIFT-LINE counter.	4203 2804	JR Z HSET	;Yes, set for horizontal char.
418D 10F4	DJNZ TURN	;Do eight turns.	4205 FE02	CP 02	;No, mode 2?
418F 7B	LD A,E	;Set to new bit pattern.	4207 2007	JR NZ VSET	;No, then set for vertical char.
4190 D1	POP DE	;Restore PRBUFF pointer.	4209 19	HSET ADD HL,DE	;Set next horiz. print position.
4191 12	LD (DE),A	;Store new pattern.	420A 220E40	LD (DFCP),HL	
4192 13	INC DE	;Increase PRBUFF pointer.	420D C3FD40	AGIN JP NXCH	;Do next character.
4193 0C	INC C	;Increase SHIFT counter.	4210 ED4B1040	VSET LD BC,(VARS)	;Set next vertical print position.
4194 3E09	LD A,09	;Test for eight lines completed.	4214 E5	PUSH HL	;Stack current print position.
4196 B9	CP C		4215 ED42	SBC HL,BC	;Greater than VARS?
4197 E1	POP HL	;Restore pattern pointer.	4217 E1	POP HL	;Restore current print position.
4198 20E5	JR NZ MORE	;Do eight patterns.	4218 38F3	JR C AGIN	;No, do next character.
419A F1	POP AF	;Restore MODE counter.	421A 1EDF	LD E,DF	;Yes, push print position back 1 row.
419B 3D	DEC A	;Is it zero?	421C 18EB	JR HSET	;Do H-SET.
419C 2803	JR Z DONE	;Yes, then done.	421E 00	NOPS NOP	;Spare space,
419E E1	POP HL	;Set new pattern pointer.	421F 00	NOP	;for your own
419F 18DA	JR ROT-	;Rotate patterns til MODE counter 0.	4220 00	NOP	;additions, etc.
41A1 E1	DONE POP HL	;Point to bit pattern to be printed.	4221 00	NOP	;20d bytes
41A2 0E04	MD-0 LD C,04	;Set row count.	4222 00	NOP	;total.
41A4 0604	2ROW LD B,04	;Set bit counter.	4223 00	NOP	
41A6 56	LD D,(HL)	;Transfer two pattern bytes to DE.	4224 00	NOP	
41A7 23	INC HL		4225 00	NOP	
41A8 5E	LD E,(HL)		4226 00	NOP	
41A9 23	INC HL	;Point to next pattern byte.	4227 00	NOP	
41AA E5	PUSH HL	;Stack the pointer.	4228 00	NOP	
41AB AF	2BTS XOR A	;Clear A and carry.	4229 00	NOP	
41AC CB12	RL D	;Determine "PIXEL" value.	422A 00	NOP	
41AE 17	RLA		422B 00	NOP	
41AF CB12	RL D		422C 00	NOP	
41B1 17	RLA		422D 00	NOP	
41B2 CB13	RL E		422E 00	NOP	
41B4 17	RLA		422F 00	NOP	
41B5 CB13	RL E		4230 00	NOP	
41B7 17	RLA		4231 00	NOP	
41B8 218440	LD HL,TABL	;Point to data table.	4232 1618	CP24 LD D,18	;Set counter for full screen copy.
41B8 85	ADD A,L	;Point to graphic symbol.	4234 1807	JR COPY	;Copy the full screen.
41BC 6F	LD L,A		4236 2A3A40	COPN LD HL,(POS)	;Partial copy set by PRINT AT
41BD 7E	LD A,(HL)	;Fetch the graphic symbol.	4239 3E18	LD A,18	;Set the counter.
41BE 2A0E40	LD HL,(DFCP)	;Point to current print position.	423B 95	SUB L	
41C1 F5	PUSH AF	;Stack the graphic symbol.	423C 57	LD D,A	
41C2 C5	PUSH BC	;Stack the ROW-BITS counter.	423D C36B08	COPY JP COPD	;Copy the set number of lines.
41C3 E5	PUSH HL	;Stack current print position.	4240 00	NOP	
41C4 7E	LD A,(HL)	;Test for row.	4241 00	NOP	
41C5 FE76	CP 76	;Is it newline marker?	4242 00	NOP	
41C7 2002	JR NZ BOTM	;No, test for room at bottom.	4243 00	NOP	
41C9 CF	ER-R RST 0BH	;Error, right margin overflow.	4244 00	NOP	
41CA 1A	ERROR R	;Error report R.			
41CB ED4B1040	BOTM LD BC,(VARS)	;Test for room at bottom of DFILE.			
41CF A7	AND A	;Clear carry.			
41D0 ED42	SBC HL,BC	;Print position greater than VARS?			
41D2 3802	JR C GOOD	;If carry then there is enough room.			
41D4 CF	ER-B RST 0BH	;Error, bottom overflow.			
41D5 0A	ERROR B	;Error report B.			
41D6 E1	GOOD POP HL	;Restore the current print position.			
41D7 C1	POP BC	;Restore the ROW-BITS counter.			
41DB 3A2140	LD A,(GFLG)	;Test for graphic character.			
41DB FE00	CP 00	;Is G-FLAG set?			
41DD 2805	JR Z GZRO	;No, then print normal character.			
41DF F1	POP AF	;Yes, restore the graphic symbol.			
41E0 EEB0	XOR 80	;Invert it.			
41E2 1801	JR PRNT	;Print inverted symbol.			
41E4 F1	GZRO POP AF	;Restore the graphic symbol.			

! OFF THE WALL

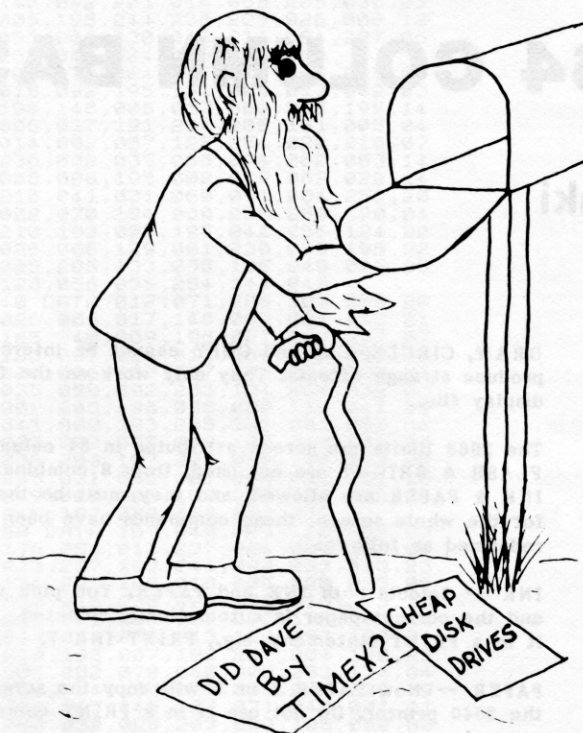
STRANGE GOINGS ON...

ZX81 - Enter and RUN this little program:

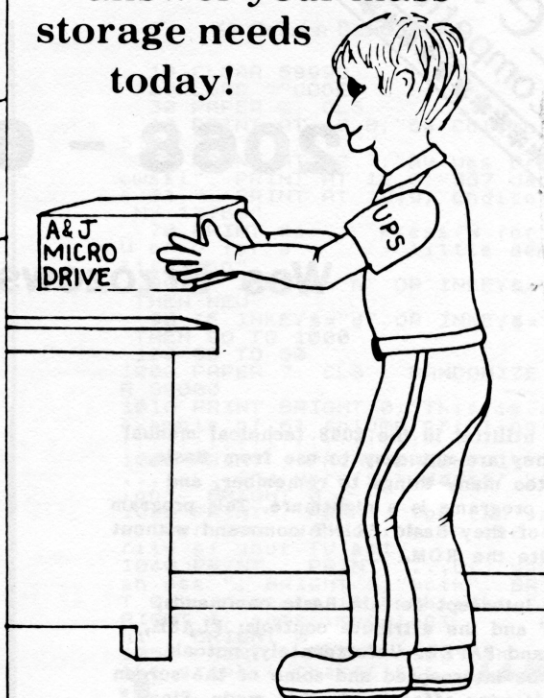
```
10 FOR A=1927 TO 1941
20 RAND USR A
30 NEXT A
```

Hm... Now enter RAND USR 1917 (or any number between 1917 and 1924) and watch the ROM try to LIST itself.

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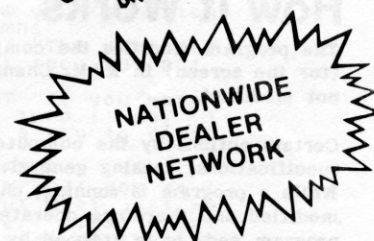


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TS2068

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2068 - 64 COLUMN BASIC

Wes Brzozowski

The 64 column utilities in the 2068 technical manual do work, but they are not easy to use from Basic. There are far too many things to remember, and debugging your programs is a nightmare. This program allows the use of they Basic PRINT command without having to rewrite the ROM.

It's possible to intercept certain Basic commands, such as, PRINT and the attribute controls; FLASH, BRIGHT, INK and PAPER. Unfortunately, not all commands can be intercepted and some of the screen commands aren't very effective in this mode. Since the attribute commands have almost no meaning in 64 columns, they have been redefined to do useful things.

How it Works

The program modifies the computer's I/O channel #2 (for the screen) in RAM. Channel #1 (EDIT line) is not modified.

Certain actions by the computer will change channel specifications, causing general chaos on the screen. While a program is running, channel 2 is not modified and therefore operates reliably. When the program ends or is stopped by an error, the 64 column mode is switched off. This is done by modifying the machine stack so that another switching utility is run before the error message is displayed. This infringes on the "territory" of the ON ERROR command.

The built in error handling can be bypassed with RANDOMIZE USR 60016. When the program ends, you will still be in 64 column mode. If you're careful, you can list short programs. Things will get very messy quickly thereafter. When ON ERROR is active, you will have complete control when the program ends. Without it, RANDOMIZE USR 60651 before stopping, in order to return to 32 column mode. It is also legal to switch between modes while the program is running by use of the two USR calls. Just don't BREAK while you're in 64 column mode.

Although the 64 column code is 694 bytes long, not all of the area above 60693 is vacant. The RAM resident code (see SWN 2/3), UDG's and machine stack are all up there too. There is 1.5K of space up there for your expansion.

The Rules

RANDOMIZE USR 60000 gets you started.

Print works as before, and TAB and AT are now expanded to 64 columns. OVER and INVERSE work as before. UDG's still work, but they may need some redefinition due to the change in character shape.

DRAW, CIRCLE, CLS and COPY cannot be intercepted and produce strange effects. They only work on the first display file.

The 2068 limits the screen attributes in 64 columns. FLASH & BRIGHT are not used. Only 8 combinations of INK & PAPER are allowed, and they must be the same for the whole screen. these commands have been redefined as follows:

INK -- Selects both INK and PAPER. You pick the ink and the correct paper is automatically selected. Use it in a PRINT statement, e.g., PRINT INK 7.

PAPER -- Now PAPER 1 or 0 will copy the screen to the 2040 printer. Do not use it in a PRINT command.

FLASH -- FLASH 1 or 0 will clear the 64 column screen. Do not use it in a PRINT command.

BRIGHT -- BRIGHT 1 now bolds the text (similar to Fat Characters), which will make TV 64 column viewing easier. BRIGHT 0 will return characters to their normal size. The modes can be mixed on the screen. E.G., PRINT BRIGHT 1.

Scrolling is particularly troublesome and is not implemented here. A full screen causes an "out of screen" error similar to the TS1000. Characters in the edit line print in every other column. 64 columns in the edit line is not reliable. Finally, it would be best not to use ON ERROR until you fully understand the system.

I do hope you enjoy using this program as much as I enjoyed developing it.

64 Column Machine Code

Enter this Basic listing and RUN it to incorporate the 64 column machine code. Then NEW the computer and type in the 64 column DEMO or write one yourself which makes use of 64 columns.

```
1 REM 64 column code by Wes B
2 RZCZOWSKI
3 10 DATA 042,061,092,078,035,07
4 0,237,067,017,237,001,220,236,11
5 0,043,113,062,128,211,255,062,00
6 0,211,244,062,006,205,142,014,17
7 0,211,244,219,255,203,191,211,25
8 0,000,042,079,092,001,191,234,03
9 0,035,035,035,035,113,035,112,17
10 0,050,000,064,001,255,023,017,00
11 1,064,033,000,064,237,176,050,00
12 0,096,001,255,023,017,001,096,03
13 0,000,096,237,176,033,065,024,03
14 1,136,092,033,000,064,034,132,09
15 0,201,205,026,006,254,032
16 20 DATA 210,127,235,254,006,05
17 0,091,254,024,048,087,033,207,23
18 4,195,030,005,065,080,016,035,07
19 0,076,075,049,073,072,090,089,08
20 0,067,086,065,078,077,012,062,06
21 0,185,032,011,004,014,002,062,02
```



```

5,184,032,003,005,014,065,195,04
4,236,058,145,092,245,253,054,05
7,001,062,032,205,172,235,241,05
0,145,092,201,014,065,205,030,23
0,005,195,044,236,205,026,006,12
1,061,061,230,048,214,064,237,06
0,230,048,024,079,062,063
30 DATA 024,085,017,063,235,05
0,015,092,195,151,005,017,042,23
0,195,148,005,017,063,235,195,14
0,005,017,191,125,205,151,005,04
0,014,092,087,125,254,022,218,07
0,236,032,035,060,074,062,063,14
0,056,005,198,002,079,062,022,14
4,218,041,031,060,071,004,253,20
0,002,070,194,030,236,253,190,04
0,218,193,007,195,044,236,124,20
0,026,005,129,061,230,063,195,22
0,005,205,133,235,195,249,005,25
4,128,056,035,254,144,048
40 DATA 012,071,205,109,006,20
0,026,005,017,146,092,024,045,21
4,165,048,009,198,021,197,237,07
0,123,092,024,011,205,069,007,19
0,026,005,197,237,075,054,092,23
0,033,059,092,203,134,254,032,03
0,002,203,198,030,000,111,041,04
1,041,009,193,235,121,061,062,06
0,032,002,005,079,185,213,204,03
0,236,209,197,229,058,145,092,00
0,255,031,056,001,004,031,031,15
0,079,062,008,167,235,008,026,16
0,245,197,070,058,012,237
50 DATA 167,040,009,120,203,03
0,176,050,013,237,024,004,120,05
0,013,237,193,241,229,033,013,23
7,174,225,169,018,008,020,035,06
1,032,215,235,225,193,013,203,10
0,040,001,035,062,032,172,103,20
1,017,044,236,213,120,253,190,04
0,218,193,007,192,207,004,120,25
0,203,002,070,040,005,253,134,04
0,214,024,197,071,205,214,009,19
0,062,065,145,203,071,040,004,01
7,000,032,025,203,063,195,050,00
9,254,016,040,018,254,017
60 DATA 040,037,254,018,202,14
0,234,254,019,040,020,254,020,19
0,201,035,122,230,007,007,007,00
0,071,219,255,230,199,176,211,25
0,201,000,122,230,001,050,012,23
7,201,243,237,075,014,237,197,06
0,000,050,016,237,205,148,236,19
0,062,016,050,016,237,205,148,23
6,251,201,205,189,236,017,000,09
1,205,171,236,033,000,091,197,00
0,000,205,074,010,193,012,016,23
4,201,197,006,016,126,018,019,20
3,236,126,018,019,203,172
70 DATA 035,016,243,193,201,12
1,230,007,103,121,203,063,203,06
0,203,063,230,024,130,246,064,10
0,058,016,237,111,121,203,039,20
0,039,230,224,181,111,201,205,23
5,236,042,061,092,237,091,017,23
7,115,035,114,235,233,062,128,21
1,255,062,001,211,244,062,000,20
5,142,014,175,211,244,211,255,04
0,079,092,001,000,005,035,035,03
5,035,035,113,035,112,201,000,00
0,000,192,016,141,014,001,000,00
0,000,000,000,000,000,000
1000 CLEAR S9999: LET X=60000
1010 FOR J=10 TO 70 STEP 10: RES
TORE J: FOR I=1 TO 100: READ A:
POKE X,A: LET X=X+1: NEXT I: NEX
T J:
2000 SAVE "64colbas" LINE 1000

```

64 Column Basic Demo

```

10 CLEAR S9999
20 LOAD ""CODE
30 PAPER 2: CLS
40 PRINT AT 10,8;"64 Column BA
SIC"
50 PRINT AT 12,7;"By Wes Brzoz
owski": PRINT AT 12,8;"337 Janic
e St.": PRINT AT 12,9;"Endicott,
NY 13760"
70 PRINT #1;" Press N for NE
W or D for a little demon
stration"
80 IF INKEY$="n" OR INKEY$="N"
THEN NEW
90 IF INKEY$="d" OR INKEY$="D"
THEN GO TO 1000
100 GO TO 80
1000 PAPER 7: CLS: RANDOMIZE US
R 60000
1010 PRINT BRIGHT 0;"This is an
example of 64 column printing!!!
!!!!!!!!!!!!!!!!!!!!!!"
1020 PRINT: PRINT BRIGHT 1;"...
.....And Here's a darker vers
ion"; BRIGHT 0
1030 PRINT: PRINT "You can use
either one, depending on the cla
rity of your TV set"
1040 PRINT: PRINT "...Or, you c
an use "; BRIGHT 1;"both"; BIGH
T 0;" in order to highlight "; B
RIGHT 1;"some important poi
nt"; BRIGHT 0
1050 PRINT: PRINT "You can use
the graphic characters...■■■■■"
1060 PRINT: PRINT INVERSE 1;"...
.Or inverted characters"; INVERS
E 0
1070 PRINT: PRINT "And you do i
t all with BASIC commands!!!!!!
!!!!!!!!!!!!!!!!!!!!!!"
1080 PRINT: PRINT "AT and TAB s
till work, but now you can exten
d them to 64 columns"
1090 PRINT: PRINT "The user def
ined graphics work too, but not
too clearly."
1100 PRINT: PRINT "If you have
a TS2040 printer, turn it on. I
n any case, press a key to conti
nue"
1110 PAUSE 4e4: PAPER 1
1120 FLASH 1: PRINT "If you're t
rying to figure out what just ha
ppened, the printer first print
ed the left hand side of the scr
een, and then the right side.
The alternative, (printing sid
eways) could just as easily have
been done, but it uses up 1/3 m
ore paper. Using scissors an
d glue is a bit bothersome, but
not overly much. I hope you'll
agree."
1130 PRINT BRIGHT 1;AT 8,9;"The
64 column mode is limited by the
hardware"
1140 PRINT AT 9,9;"to only 8 com
binations of ink/paper, and only
"
1150 PRINT AT 10,9;"a couple of
those are readable. Press a key
"
1160 PRINT AT 11,9;"to see all e
ight combinations....."
1170 PAUSE 4e4
1180 FOR J=1 TO 8: INK (8-J): PA
USE 60: NEXT J
1190 PRINT: PRINT "And now, if
you'll press another key, I'll r
eturn you to the 32 column mode.
Go ahead..list the program and
look at the almost-normal BASIC
commands used. Now change it a
round, and see what happens. Re
-enter with GOTO 40."
1200 PRINT: PRINT "
***** HAVE FUN!!!!!! *****"
1210 PAUSE 4e4
1220 BRIGHT 0: FLASH 1: STOP
9000 STOP
9900 OUT 244,1: MOVE "wes64col.b
as",10: MOVE "64code.bin",60000,
800: OUT 244,0: STOP
9901 REM aerco disc save
9999 SAVE CHR$ 18+CHR$ 1+"64cols
"+CHR$ 18+CHR$ 0 LINE 10: BEEP:
1,1: SAVE CHR$ 18+CHR$ 1+"code!!
"+CHR$ 18+CHR$ 1CODE 60000,800

```

! OFF THE WALL

TS2068 - Turn on your machine and type LOAD " (or any other syntax error). Hold down the ENTER key for 7 or 8 "clicks". No, your machine isn't broken, they're all that way. Turn it off and on again, enter RANDOMIZEUSR 32000. Oh, just returns you to the copyright notice... now press Enter again, or just wait a few seconds. Like, wow!

-fn

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2068 MACHINE CODE IN A DATA STATEMENT

Charles Stelding
1415 S. Baxter
Tyler, TX 75701

This program will allow you to place machine code that is located anywhere in memory into a data statement in line 1 of your Basic program.

Enter the program as is and SAVE it by typing GOTO 8000. RUN the program, and it will POKE the necessary data starting at 65000. If you have made a typing error, then the program will stop and indicate the line in which the error was made. Check the line and correct the error. From this point on it will only be necessary to have the code located at 65000 in order to create a 1 DATA statement.

You will then be asked to give the starting address of the machine code to be placed in line 1, followed by the length of the code. For instance, if you enter 65000 for the starting address, and 8 for the number of bytes, then line 1 will have the same contents as line 10 (except for the checksum at the end).

If there is a line 1 already present, then the program will return to basic without creating a DATA statement. This utility was adapted from John hardman and Andrew Huson's, 40 Best Machine Code Utilities for the ZX Spectrum (Hewson Consultants: London, 1982), pp. 96-100.

```

10 DATA 237,91,0,91,237,75,2,9
1,824
20 DATA 120,177,200,42,83,92,1
26,254,1094
30 DATA 0,32,6,35,126,254,1,20
0,654
40 DATA 43,229,197,213,151,205
,238,10,1286
50 DATA 235,62,1,205,238,10,23
5,205,1191
60 DATA 238,10,235,205,238,10,
235,62,1233
70 DATA 228,205,238,10,235,209
,26,213,1364
80 DATA 14,47,12,6,100,144,48,
250,621
90 DATA 128,71,121,197,205,238
,10,235,1205
100 DATA 193,120,14,47,12,6,10,
144,546
110 DATA 48,250,128,71,121,197,
205,238,1258
120 DATA 10,193,235,120,198,48,
205,238,1247
130 DATA 10,235,62,14,6,6,197,2
05,735
140 DATA 238,10,193,235,151,15,
247,209,1299
150 DATA 229,43,43,43,26,119,22
5,19,747
160 DATA 193,11,120,177,40,10,1
97,213,981
170 DATA 62,44,205,238,10,235,2
4,173,991
180 DATA 62,13,205,238,10,225,1
0,754
190 DATA 0,35,35,34,93,35,35,3,
320
200 DATA 126,254,14,32,12,3,3,3
,447
210 DATA 3,3,35,35,35,35,35,24,
205
220 DATA 237,254,13,32,233,121,
18,19,927
230 DATA 120,18,201,0,0,0,0,3
39

```

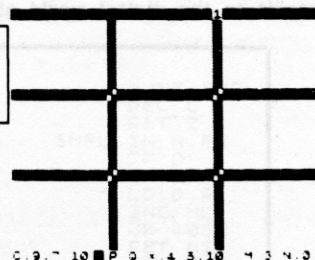
```

1000 RESTORE : CLEAR 64999 : LET
line=0 : PRINT "LOADING DATA"
1010 FOR k=65000 TO 65178 STEP 8
: LET line=line+10 : LET test=0
1020 FOR j=0 TO 7 : READ data : LE
T test=test+data : POKE (k+j),dat
a : NEXT j
1030 READ total : IF total<>test
THEN PRINT FLASH 1:"Typing mista
ke AT LINE ";line : LIST line
1040 NEXT k
1999 REM
2000 REM Actual program follows.
2001 REM delete lines 10 TO 2001
2010 CLS : PRINT " TO PUT MACHIN
E CODE INTO", " DATA STATEMENT IN
LINE 1"
2020 INPUT " INPUT STARTING ADDR
ESS OF CODE " : A : PRINT A
2025 POKE 23297,INT (A/256) : POK
E 23298,A-(INT (A/256))*256
2030 INPUT " INPUT NUMBER OF BYT
ES TO PUT IN LINE 1" : A : PRINT A
: FLASH 1:"LOADING DATA INTO LI
NE 1"
2035 POKE 23299,INT (A/256) : POK
E 23298,A-(INT (A/256))*256
2040 RANDOMIZE USR 65000 : CLS :
LIST
7999 STOP
8000 SAVE "DATA LINE1" LINE 1 : SA
VE "MC2DATA"CODE 65000,179 : VERI
FY "" : VERIFY ""CODE

```

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WHAT, WE WORRY?

For those of you who thought that we were just a couple non-existent characters beyond your end-of-line marker, we decided to trip your NMI and create a full display file. Of course that's quite easy to do from a Bent ROOM. Anyway, this should prove beyond a shadow of a doubt that we are indeed a couple of real characters.

To the left is creator of Profile, an avid Ham Hacker and naturalist who escaped from civilization by moving to the northern frontier and roughing it. As civilization encroached upon his settlement, with it came the local 5 & dime stocking oodles of TS computers. Then, bitten by the bug, Tom Woods has moved into the forefront as a true TSelebrity. There were rough times too. Publishing SWN Vol. 1 and Profile 2068 simultaneously, left him bound and gagged. As you can see by the picture, he has unraveled himself, although he is still looking for those bytes that the bug got. Of course, nowhere in the TS owners manual does it say that TS computers are not set up for multi-tasking, but then again, who reads that book anyway?

In the center, we have the grand father of SyncWare News (funny, he doesn't look that old). In contrast to Mr. Woods, Fred Nachbaur left the northern frontier and escaped to high society (Los Angeles). Once there, he endeavored to the heights of electronic wizardry, creating battery backups. The Granddaddy BBU just by chance is located on the file cabinet just to the right. (Fred, when do I get it back?) After surviving an extended stint down South, and not to be out done by Mr. Woods, Fred once again trudged northward. Fred is a confirmed "analog" man. In contrast to the digital world of steps, Fred

likes nice smooth ramps up and down. Well, I guess you have to learn to crawl before you learn to walk. Of course, Fred has now had a chance to dabble with IC's and has come up with some award winning fixes for TS Computers of all sizes. Needless to say he is uniquely qualified.

And in the lower right corner is the illustrious editor (do you seriously think that I would roast myself?) of SWN. I have always enjoyed the high tech field. As a pilot, some years ago, I found myself grounded due to the lack of usable air in the Northeast Corridor. Needing the feel of real power in my hands, I grabbed hold of a black box and started tinkering. As of today, I am still tinkering, trying to figure out and understand what I am doing. Although I have done a lot, its usefulness is questionable. (By the way Tom, I found a couple of more extra bytes in the 8K ROM. Maybe you can use them.) Since SWN has come on the scene, I have been able to channel my efforts. I just need to remember to connect my interface so that my streaming I/O doesn't go in one ear and out the other.

And a serious note: This photo was taken on 4/19/85, shortly before SWN 2/5 was completed. It was the first meeting for the three of us. By far our largest competitor is distance (and Ma Bell), but SWN has grown tremendously this year. We expect to grow even further in the next year. SWN presently circulates 1500 legal copies, and you can rest assured that there are a lot more readers than that. We hope to expand in size (more pages), but the TS economics prevent this presently.

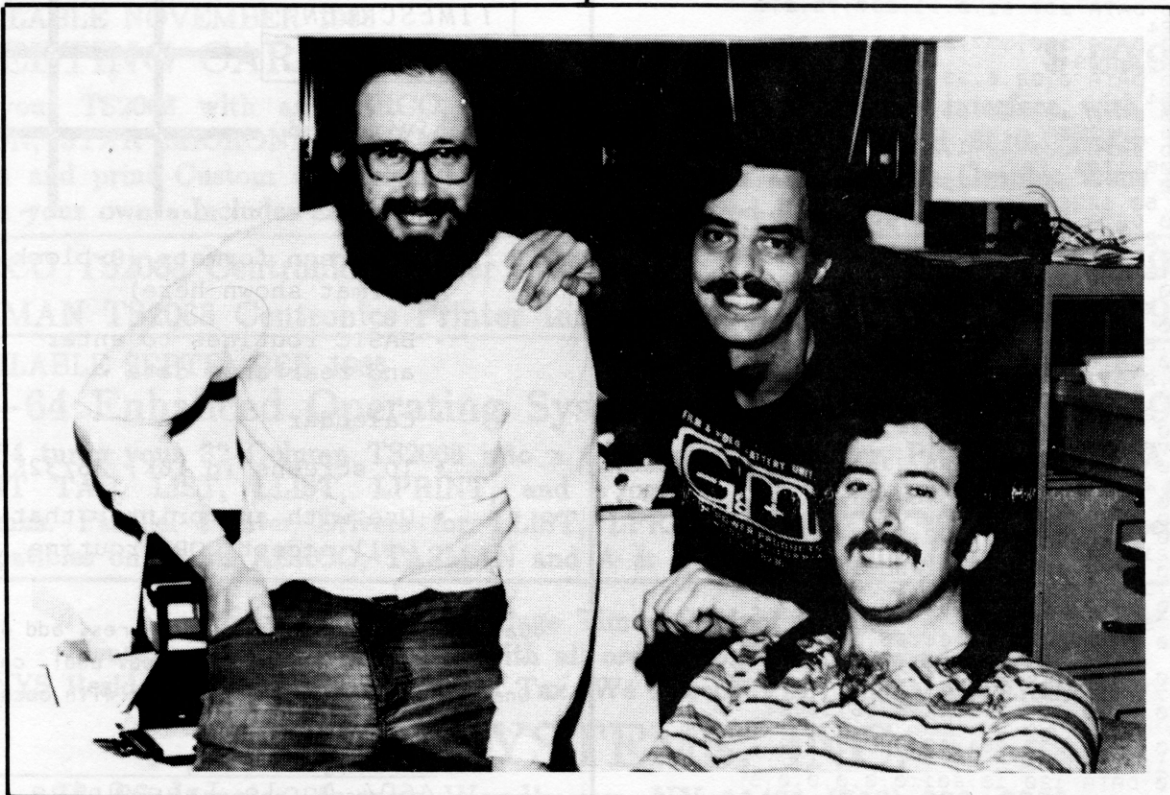


Photo: Judi Bent

AUDIO FREQUENCY COUNTER

By Charles F. Milazzo, KP4MD
USNS Box 3007
FPO Miami, FL 34051

Reprinted with permission from QZX

This program will run in as little as 1K of RAM and will allow frequency measurements (to about 15 kHz.) using the ZX81, TS1000 or TS1500. Uses include tuning RTTY tone generators, electronic musical instruments, tone encoders, and for calibrating audio generators. The audio signal is fed to the computer's earphone jack, and the frequency is displayed to the nearest Hz. on the screen.

The work is done by a 62-byte machine language routine which is stored in a line 1 REM statement (memory locations 4082h to 40BFh). The hexadecimal codes should be loaded with a machine code loader after first entering a REM statement with 62 spaces. Alternatively, the decimal equivalents may be POKEd with a decimal loader loop into these locations (16515 to 16575).

The entry point to the machine language routine is at address 4092h (16530d). Here the value 7055h (corresponding to 6F55 = 28501d; see * below) is loaded into the BC register pair, the value 3F is loaded into D, and HL is initialized to zero. The routine then calls the cassette port sampling loop at 4082-4091h. Each cycle of the loop required an average of 57.015 machine cycles and decrements the BC register pair. When the value in BC reaches zero,

exactly 1/2 second has passed and a return is made from the loop. During each loop cycle, input port FE is sampled. If the input is high, 3F is loaded into the accumulator; if it is low, then BF is loaded instead. This value is compared with the previous value which had been stored in register D, and the HL register pair is incremented if a change has occurred. As each audio signal cycle involves two transitions, the count in HL after 1/2 second is equivalent to the number of complete cycles in 1 second.

Upon returning from the loop, the previously displayed frequency is erased by printing 5 spaces at the beginning of the display file. [Not strictly necessary, as the "print contents of HL" routine would over-write the old data. - fn] If the count in HL was zero, the routine returns to BASIC, otherwise the PRINT position is returned to the beginning of the display file, using the ROM "print at" routine at 08F5. Then the contents of HL is printed as a 5 digit decimal integer with suppressed leading zeros, using ROM routines 07E1 (print a digit) and 0AA0 (print line number digits for BASIC listings). The screen is blank during the .5 second sampling period, then the frequency is displayed during the PAUSE in line 5. The applied signal voltage should be about 3 or 4 volts (amplification through the cassette recorder's monitor output may be usable for some signals). Lowest measureable frequency is around 100-200 Hz. and is limited by the computer's cassette port circuitry.

The accuracy of the frequency count depends on the computer's clock frequency which is nominally 3.25 MHz. The TS1500 uses a quartz crystal, which is very accurate. However, the ceramic elements in the other

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```

4082 1002      DJNZ 5MPL
4083 0D        DEC C
4084 03        RET Z
4085 08BFE     5MPL IN A,FE
4086 08A       CP D
4087 0804      JR Z,408F
4088 0807      LD D,A
4089 0803      INC HL
4090 08F3      JR 4082
4091 0800      RET NZ
4092 08F0      JR 4082
4093 0817055   INIT LD BC,5570
4094 080F      LD D,3F
4095 0810000   LD HL,0000
4096 0808640   CALL 5MPL
4097 0808      PUSH HL
4098 08F508     CLSC CALL PRAT
4099 080805    LD B,05
40A0 0808      XOR A
40A1 0807      RST 10H
40A2 080F0     DJNZ 40A3
40A3 0808      POP HL
40A4 0808      LD A,H
40A5 0808      OR L
40A6 0808      RET Z
40A7 0808      PROQ PUSH HL
40A8 0810000   LD BC,0000
40A9 08F508     CALL PRAT
40AA 0808      POP HL
40AB 0808      PUSH HL
40AC 0808      LD E,00
40AD 080808F0  LD BC,D8F0
40AE 0808107   CALL 10UT
40AF 08080808  CALL THOU
40B0 0808      RET
40B1 0808      NOP
40B2 0808      NOP
40B3 0808      NOP
40B4 0808      NOP
40B5 0808      NOP
40B6 0808      NOP
40B7 0808      NOP
40B8 0808      HLT
40B9 0808      HLT

```

```

1 REM (BC005) RETURN BC, 77/
NEXT "/ LIST 27-25 LN RAND F
AST LN PRINT "NOT (UNPLOT LP
RINT "BC005 FAST LN PRINT LP
RINT FAST 2 LIST **LN LPRINT F
LN "AN
2 REM AUDIO FREQUENCY COUNTER
CHARLES MILAZZO SEPT 84
3 FAST
4 PRINT AT 0.6/"HZ FREQUENCY
COUNTER"
5 RAND USR 15530
6 PAUSE 150
7 GOTO 5

```

models can vary significantly. The initial value of the BC register pair can be changed to compensate for these variations. Measure the clock frequency with a counter or loosely-coupled, well calibrated receiver. Divide the frequency in Hz. by 114.03 and convert to hexadecimal.

* Load the LEAST significant byte into the B register; add 1 to the most significant byte and load into the C register. E.g., for a clock frequency of 3.225 MHz.: $3225000/114.03 = 28282 = 6E7Ah$. Change machine code statement at 4092h to 016F7A (LD BC,7A6F).

I have experimented extensively with this program in the interest of optimizing it, and have observed that, as predicted by the sampling theorem, frequencies above one-half the sampling rate (14,250 Hz.) cannot be counted accurately due to sampling errors. Likewise, the program must be run in FAST mode; one could use SLOW and compensate for the difference in sampling rate with a change in the initial value loaded into BC. However, since the sampling period is broken up into small segments occurring at the top and bottom margins of the picture, this results in random sampling errors that make the printed results less accurate.

Additional Notes

Routine names: SMPL - sample loop subroutine. INIT - initialization (entry point). CLSC - clear first five spaces on screen. PR00 - restore print position to start of display file. PRHL - print contents of HL.

The PRHL routine is very handy anytime you need to print a two-byte number as a decimal integer, and is a lot faster than floating-point printing. E.g. RAND (non-zero number or BASIC variable) then RAND USR xxxxx where xxxxx starts with LD HL,(4032), then CALL PRHL, then RET. Control print position either from BASIC, or use the ROM routine at 08F5 as in this program. Note the extra PUSH HL in the PRHL routine; this is not an error, it is POPped back off by the ROM routine.

A novel use for the SMPL routine is to sense if the tape recorder is turned on with the tape positioned at the "pre-save buzz". E.g.

```

990 SLOW
1000 PRINT "LOAD NEXT PROGRAM Y/N?"
1010 IF INKEY$="" THEN GOTO 1010
1020 IF INKEY$<>"Y" THEN STOP
1030 CLS
1040 PRINT "PLEASE TURN ON TAPE RECORDER"
1050 IF NOT USR 16518 THEN GOTO 1050
1060 LOAD ""

```

-fn

*** Smart Text ***

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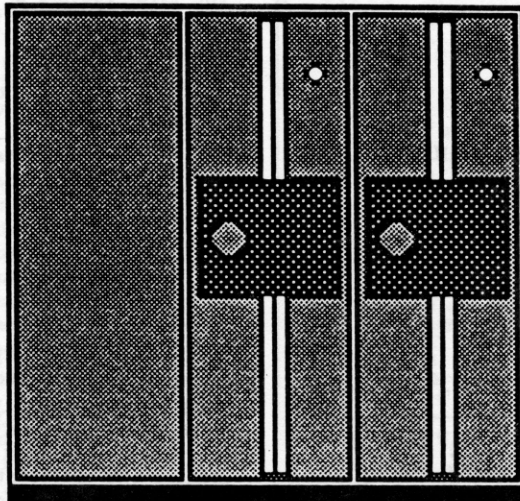
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CIDS Part -2

In this installment of CIDS, we will develop six essential routines. The only routine that is not a command is the error report routine. Also, as all programs are prone to revisions and extensions, the error routine may not reflect future versions, since the error routine takes memory that could be used for another command.

The names of these routines are:

1. MAKE
2. FIND
3. ADTO
4. DELETE
5. DISPLAY

To get started, LOAD"" and ENTER. Note that if CIDS was not properly SAVED, you will get a variable not found error. To correct the problem, EDIT 9010 and remove the REM in the statement. RUN the program.

When the READY>> prompt appears, SHIFT 6 and LIST 9010. CIDS is now ready to be edited or otherwise modified.

As I began to program CIDS, I realized that I needed an error routine [Listing One] unlike those used for menu based programs. Since the program is controlled through the parser [200-290], you cannot be sure what command will be presented next. Most of the trapping is therefore taken care of within the subroutines themselves. When an error is detected and if it is sent to the error routine, an appropriate response is displayed on the monitor. Some errors are taken care of within the routines themselves rather than the error routine. For example, it would be inappropriate to have a special error report if you happen to hit the 't' key instead of the 'y' key.

Listing One should be entered now.

The most common error is the 'no file' error. When this error is encountered it means that you did not 'find' the file before you attempted to work on it. If you remember to 'find' your files, then you won't ever encounter this error. Other errors are a little less encountered. For example, if you try to invoke the 'previous' command, but you haven't used the 'next' command. If you think about it a bit, it only makes sense. How can you go to a previous screen if you haven't gone to at least the second one. This part of the program is almost self explanatory. It gives you an idea of the variety of things that can happen when CIDS is presented with bogus input.

It's simply impossible to know what is going to be proffered to the program, but it is an easy matter to know what is allowed and what kind of input to look for. We will focus our error trapping, not by predetermining the input, but by using only input that makes sense. Note that the majority of the routines have as their first line of code:

```
nn IF g=0 THEN GO TO 9995
```

We know that a file cannot be worked with unless it is in working memory. Since g keeps track of this, we

know that if g is equal to zero we have no file with which to work. It simply a matter of displaying the appropriate error on the screen. There is no need to balk on the rest of the input because of one error. The error routine is hard to follow, but it is essential if CIDS is to run properly.

The 'make' routine [LISTING TWO], is the command that will allow you to create new files. Follow the procedure in Figure two to make a file.

Figure two. Making Files.

File names must be five or more characters.

1. make <filename> ENTER
2. make <filename>-<extension>- ... ENTER
3. make <filename>[SPACE],[SPACE]<filename> , ... ENTER

In the first case only one file is being made. The second example illustrates the fact that if you are going to make files with names consisting of two or more words, the words must be separated by any character other than a space. The last example creates two different files. Enter listing two. When you are done, practice making your own files. Remember that you must use GO TO 98 to get CIDS running again.

Resume editing CIDS. Now that you have the ability to make files, you will need some way to locate them. This can easily be accomplished by a loop that compares the name that you supply with the names in the database. Then it is simply a matter of printing the appropriate responses. The 'find' command [LISTING THREE] will allow you to do this. The command syntax is:

1. find <filename> ENTER

As CIDS stands right now you cannot do anything to the files you find. The majority of your time will probably be spent editing files. This means that you will need a routine that allows you to:

1. Edit files easily.
2. Restore messed up files to their original state.
3. Accomodate new commands.

Figure three. Full screen editor commands.

To access the editor:

1. You must have a file in memory. If you don't, then 'find' one.
2. From READY>> enter the command 'adto,' and you will be in the SCAN MODE.

SCAN MODE commands.

- | | |
|------------------|---------------------------|
| 5, 6, 7, 8, keys | Cursor movement. |
| h key | Home (1,1) position |
| SHIFT 1 keys | Go to EDIT MODE |
| r key | Return to READY>> prompt. |

EDIT MODE commands.

- | | |
|-------------------|-----------------------|
| SHIFT 5, 6, 7, 8, | Cursor movement. |
| SHIFT 4 key | Insert characters. |
| SHIFT 0 key | Delete characters. |
| ENTER | Acts as a return key. |
| SHIFT 1 keys | Go to SCAN MODE. |

disp xx to xx where xx is a two digit number.

disp 01 to 09 will display the first nine lines of every file. The line clause will stay in effect until you change it again.

Now that you can create, edit and display files, you will need a way to remove unwanted files from the database. Since we are not working with linked lists or tree structures, we will use a simple method of deletion. This entails writing over the file to be removed with the file that immediately follows it, and continuing until the entire database is moved up one file. This brute force method will eliminate the offending file while keeping the integrity of the rest of the database. Enter listing six into the computer. Now when you wish to delete a file, you simply find it and invoke the delete command. You will be prompted to verify the delete process.

Before the file is deleted, it is written to a 2D array. This array can be written back to the database if you decide that you want the file back. As it is now, you are unable to 'restore' a file. Although most of the work can be done by the routines we have just written, it will be up to you whether or not you wish to wait for the next installment of CIDS, or boldly plunge into the unknown and attempt to write a restore routine for yourself.

You will be unable to save or load your database from CIDS, but you can program these routines from Basic if needed. I am going to save these for the next issue. In the next issue we will discuss the following commands as well:

- | | |
|---------|-------------|
| 1. SORT | 4. PREVIOUS |
| 2. NEXT | 5. RESTORE |
| 3. NAME | 6. MOVE |

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LISTING THREE - FIND ROUTINE [500-555]

```
500 IF LEN a$<5 THEN GO TO 9995
505 GO SUB 240: IF LEN w$<5 THE
N GO TO 9995
515 LET s$=w$
530 FOR g=1 TO f: IF f$(g,1) TO
LEN s$)=s$ THEN GO TO 555
540 NEXT g

541 LET g=prev
545 PRINT s$;" (NOT THERE)"; RE
TURN
555 PRINT s$;" --FOUND--"; RE
TURN
```

command line < 5 chars.
slice filename out of a\$:
filename < 5 chars?
store name in s\$
loop to search for file
keep looping until a
match is found or all
files exhausted
g=previous filename
file not found report
file found report:
return

VARIABLES USED

a\$ =: command line
w\$ =: word sliced from a\$
s\$ =: general purpose
g =: loop
f =: file counter
prev =: number of previous file

LISTING FOUR - ADTO ROUTINE

```
5010 IF g=0 THEN GO TO 9995
5015 CLS: PRINT AT 0,0; INK 6;
FLASH 1;"SETTING"; GO SUB 6000;
PRINT AT 0,0; FLASH 0;
5020 GO SUB main
5025 RETURN
5030 PRINT AT 0,0;"L ";L;" chr
";c
5040 PRINT AT x,y; INVERSE 0;b$(
L,c): LET x=x+1: IF x>ml THEN LE
T x=ml
5042 LET l=l+1: IF l>ml THEN LET
l=ml
5045 GO TO main
5050 PRINT AT x,y; INVERSE 0;b$(
L,c): LET x=x-1: IF x<1 THEN LET
x=1
5062 LET l=l-1: IF l<1 THEN LET
l=1
5066 GO TO main
5070 PRINT AT x,y; INVERSE 0;b$(
L,c): LET y=y+1
5072 LET c=c+1: IF y>(mc-1) THEN
LET y=(mc-1)
5076 IF c>mc THEN LET c=mc: GO T
O main
5078 GO TO main
5080 PRINT AT x,y; INVERSE 0;b$(
L,c): LET y=y-1: IF y<0 THEN LET
y=0
5082 LET c=c-1: IF c<1 THEN LET
c=1
5086 GO TO main
5088 PRINT AT 0,0;"EDIT MODE"
5090 LET e$=INKEY$
5091 IF INKEY$=CHR$ (7) THEN GO
TO 1000
5092 IF e$="" THEN GO TO 91
5093 LET b$(L,c)=e$
5094 PRINT AT x,y;b$(L,c)
5095 GO TO 90

5096 PRINT AT 0,0;"
";G
O TO main
5098 PRINT AT x,y;b$(L,c): LET x
=1: LET y=0: LET l=1: LET c=1: L
ET pl=1: LET pc=1: LET bc=1: LET
ec=32: GO TO main
5100 LET ec=ec+1: IF ec>80 THEN
LET ec=80
5102 LET bc=bc+1: LET y=31: IF c
>80 THEN LET c=80
5104 GO TO main
5120 LET bc=bc-1: IF bc<1 THEN L
ET bc=1
5122 LET ec=ec-1: LET y=0: IF c<
1 THEN LET c=1
5124 IF ec<mc THEN LET ec=mc
5125 LET c=c-1: IF c<1 THEN LET
c=1
5126 GO TO main
5150 LET main=5154: PRINT AT 0,0
; INK 1; FLASH 1;"EDIT MODE"; FL
ASH 0
5154 IF x=0 THEN LET x=1
5155 PRINT AT x,0;b$(L,bc TO ec)
;AT x,y; INVERSE 1; INK 2; PAPER
7;b$(L,c);AT 0,18; PAPER 0; INK
1;"ln"; INK 6;l;" ";AT 0,28;
INK 1;"ch "; INK 6;c; INK 1;"
5156 LET c$=INKEY$: IF c$="" THE
N GO TO 5156
```

file to be edited?
set screen & variables
go to SCAN mode
return
output cursor pos.
cursor down
ditto
go to main
cursor up
ditto
go to main
cursor right
ditto
ditto: go to main
go to main
cursor left
ditto
go to main
go to EDIT mode
accept keyboard input
5091: N/U
5092: N/U
5093: N/U
5094: N/U
5095: N/U
clean status line
home cursor position
5100: N/U
5102: N/U
5104: N/U
5104: N/U
5120: N/U
5122: N/U
5124: N/U
5125: N/U
5126: N/U
see line 5560: EDIT
mode-set main to 5154
error trap
print text, current
cursor pos. and set up
status line
keyboard input in c\$

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```
5157 LET v=CODE c$: IF v>13 AND
v<32 THEN GO TO 5155
5158 IF v>143 THEN GO TO 5155
5159 IF v=13 THEN GO TO 5400
5160 IF v=10 THEN GO TO 5040
5170 IF v=11 THEN GO TO 5060
5180 IF v=9 THEN GO TO 5070
5190 IF v=8 THEN GO TO 5080
5195 IF v=7 THEN GO TO 5300
5196 IF v=12 THEN GO TO 5310
5197 IF v=5 THEN GO TO 5430
5198 GO TO 5201
```

```
5200 GO TO main
5201 LET b$(l,c)=c$: PRINT AT x,
y,c$: LET c=c+1: IF c>mc THEN LE
T c=1
5202 LET y=y+1: IF y>(mc-1) THEN
GO TO 5245
5219 GO TO main
```

```
5220 LET y=1: GO TO main
5230 LET bc=bc+1: LET ec=ec+1:
IF ec>(mc-1) THEN GO TO 5245
5240 GO TO main
5245 LET c=1: LET ec=31: LET bc=
1: LET l=l+1: IF l>ml THEN LET l
=ml
5250 LET x=l: LET y=0: GO TO mai
n
5300 PAUSE 20: LET main=5500: PR
INT AT 0,0:
GO TO main
5312 LET b$(l,c TO )=b$(l,c+1 TO
): GO TO main
5313 LET b$(l,c TO )=" "+b$(l,c
TO ): GO TO main
```

```
5314 LET y=y-1: IF y<0 THEN LET
y=0
5318 GO TO main
5400 PRINT AT x,y,f$(g,l,c): LET
l=l+1: IF l>ml THEN LET l=ml
5410 LET c=1: LET y=0: LET bc=1:
LET ec=mc: LET x=x+1: IF x>ml T
HEN LET x=ml
5420 GO TO main
5430 LET b$(l,c TO )=" "+b$(l,c
TO ): GO TO main
5500 PRINT AT 0,0: FLASH 1: INK
5: "SCAN MODE"
5501 PRINT AT x,0:b$(l,bc TO ec)
:AT x,y: INVERSE 1: INK 4:b$(l,c
):AT 0,18: INK 3:"ln": INK 5:l
: "":AT 0,26: INK 3:"ch": INK 5
: c: INK 3:""
5510 LET c$=INKEY$: IF c$="" THE
N GO TO 5510
5520 IF c$="6" THEN GO TO 5040
5530 IF c$="7" THEN GO TO 5060
5540 IF c$="8" THEN GO TO 5070
```

```
5550 IF c$="5" THEN GO TO 5080
5560 IF c$=CHR$ (7) THEN GO TO 5
150
5570 IF c$="h" THEN GO TO 5098
5575 IF c$="r" THEN GO TO 5060
5580 GO TO main
```

```
6000 LET main=5500: LET text=520
1: LET a$="": DIM b$(21,32): LET
x=1: LET y=0: LET l=1: LET c=1:
LET pt=1: LET pc=1
6030 LET bc=1: LET ec=mc:
6040 FOR w=1 TO ml: LET b$(w)=f$
(g,w): NEXT w
6045 FOR w=1 TO ml: PRINT INK 4:
INVERSE 1:b$(w): NEXT w: FOR w=
21 TO 1 STEP -1: PRINT AT w,0: I
NK 1: INVERSE 1:b$(w): NEXT w: P
RINT AT 1,0: FOR w=1 TO ml: PRI
NT b$(w): NEXT w: RETURN
6060 PRINT AT 0,0: FLASH 1: INK
4:"RESTORING": FOR w=1 TO ml: LE
T f$(g,w)=b$(w): NEXT w
```

```
6070 FOR w=1 TO 21: PRINT INK 3:
INVERSE 1:b$(w): NEXT w: FOR w=
21 TO 1 STEP -1: PRINT AT w,0: I
NK 5: INVERSE 1:b$(w): NEXT w: P
RINT AT 1,0: FOR w=1 TO 21: PRI
NT b$(w): NEXT w: PRINT AT 0,0:
INK 4:"OK -----": RETURN
```

take the CODE of c\$:
error trapping
error trap
ENTER key
cursor down
cursor up
cursor right
cursor left
SCAN mode (SHIFT '1'
delete character
insert character
it's a character not a
command so insert it into
the file
do it again
insert the character:
adjust the cursor pos.
our we on the last line
of the file?
go to main
adjust y
5230: N/U
5240: N/U
move cursor down:
check for last line
adjust x: adjust y
go back to SCAN MODE
delete character at
cursor pos.: go to main
insert character at
cursor pos.: go to main
adjust y
go to main
ENTER routine
ditto

go to main
insert character
SCAN mode:
set up status line
ditto

accept keyboard input
cursor down
cursor up
cursor right

cursor left
go to EDIT mode
put cursor at (1,1)
return to READY>>
do it again

set up editor variables

ditto
loop to put file to be
edited in a 2D array
flashy screen display

restore file: put 2D
array back into 3D
array of database
flashy screen display
return to READY>>

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LISTING FIVE - DELETE ROUTINE

```
1080 IF g=0 THEN GO TO 9995
1090 CLS : PRINT AT 0,0;"Delete
file ";f$(g,1, TO 18): LET x=2:
INK 7: GO SUB 300: INPUT "Are y
ou sure? "; LINE y$
1091 IF y$="y" THEN GO TO 1094
1092 IF y$<>"n" THEN GO TO 1090
1093 RETURN
1094 FOR s=1 TO m1: LET r$(s)=f$
(g,s): NEXT s
```

file to delete?
print filename and
verification prompt

delete the file?
abort the procedure

loop to move file to be
deleted into a temporary
storage array so that it
can be restored if you
desire

```
1100 FOR s=g TO f: PRINT AT 1,0;
1105 FOR t=1 TO m1
```

loop through the
database
display current line in
file: overwrite file to
be deleted

```
1110 PRINT AT t,0;f$(s,t): LET f
$(s,t)=f$(s+1,t): PRINT AT t,0;
PAPER 2: INK 0;f$(s+1,t)
```

keep looping: beep after
each file: move to next
file in database:

```
1115 NEXT t: BEEP .01,40: NEXT s
: LET f=f-1: LET x=0: INK 0: CLS
: GO SUB 300: PRINT AT 0,0;s$;"
>--DELETED--<": LET g=0: RETURN
```

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CONTENTS

For Your Support	3
Forum	4
Bug Alert	5
Software LO-RES (TS1000)	6
Harder	
64 Column BASIC (TS2068)	12
Brzozowski	
Put 2068 Machine Code in a	
Data Statement	15
Stelding	
What, WE Worry?	16
Audio Frequency Counter (TS1000)	17
Milazzo	
Building a 2068 Database Part 2	20
Trivisonno	

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